B03C

MAGNETIC OR ELECTROSTATIC SEPARATION OF SOLID MATERIALS FROM SOLID MATERIALS OR FLUIDS; SEPARATION BY HIGH-VOLTAGE ELECTRIC FIELDS (filters making use of electricity or magnetism B01D 35/06; separating isotopes B01D 59/00; combinations of magnetic or electrostatic separation with separation of solids by other means B03B, B07B; separating sheets from piles B65H 3/00; magnets or magnet coils per se H01F)

Definition statement

This place covers:

- Magnetic separation
- Separating dispersed particles from gases or vapour, e.g. air, by electrostatic effect
- Separating dispersed particles from liquids by electrostatic effect
- Separating solids from solids by electrostatic effect
- Separation by high-voltage electrical fields

References

Limiting references

This place does not cover:

Filters making use of electricity or magnetism	B01D 35/06
Separating isotopes	B01D 59/00
Combinations of magnetic or electrostatic separation with separation of solids by other means	B03B, B07B

Informative references

Attention is drawn to the following places, which may be of interest for search:

Separating sheets from piles	B65H 3/00
Magnets or magnet coils per se	H01F

B03C 1/00

Magnetic separation

Definition statement

This place covers:

Separation of particles out of a fluid or a stream of particles using magnetic effects.

References

Limiting references

This place does not cover:

Combinations of cyclones with filters, for separating particles from gases or vapours	B01D 50/00
Combinations of dry separating apparatus with wet separating apparatus	B03B

Informative references

Attention is drawn to the following places, which may be of interest for search:

Filters in general	B01D
Separation in general	B01D
Processes for separating dispersed particles from gases or vapours by gravity, inertia or centrifugal forces	B01D 45/00, B01D 45/12
Processes for separation of gases or vapours or for recovering vapours of volatile solvents from gases by centrifugal force	B01D 53/24
Wet separating using liquids	B03B, B03D
Devices for separating or removing fatty or oily substances or similar floating material from water, waste water, or sewage	C02F 1/40
Device in sewers for separating liquid or solid substances from sewage	E03F 5/14
Measuring, investigating or testing electric or magnetic properties of materials (see also IPC definition for subgroup G01N 33/50)	G01R
Materials for magnets or magnetic bodies	H01F 1/00

Special rules of classification

The following Indexing Codes are used:

Indexing Code B03C 2201/16	magnetic separating gases form gases e.g. oxygen from air
Indexing Code B03C 2201/18	the particles are suspended in a liquid
Indexing Code B03C 2201/20	the particles to be separated are in solid form
Indexing Code B03C 2201/22	characterised by the magnetical field, special shape or generation
Indexing Code B03C 2201/28	parts being easily removable for cleaning purposes
Indexing Code B03C 2201/30	for use in or with vehicles

B03C 1/002

{High gradient magnetic separation}

Definition statement

This place covers:

Any type of magnetic separation method that uses a high gradient magnetic field, which is directly acting on the substance being seperated.

References

Limiting references

This place does not cover:

Magnetic separation device that uses a high gradient magnetic field acting directly on the substance being separated	B03C 1/025
High gradient magnetic separation acting on the medium	B03C 1/32

B03C 1/005

Pretreatment specially adapted for magnetic separation

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnets or magnetic bodies characterised by the magnetic materials therefor; Selection of materials for their magnetic properties	H01F 1/00
Magnetic liquids	**H01F1/46**

B03C 1/01

by addition of magnetic adjuvants

Definition statement

This place covers:

Any type of magnetic adjuvants not having an advanced chemical reaction with the particles to be separated.

B03C 1/015

by chemical treatment imparting magnetic properties to the material to be separated, e.g. roasting, reduction, oxidation

Definition statement

This place covers:

Any type of magnetic adjuvants having a chemical reaction with the particles to be separated.

B03C 1/025

High gradient magnetic separators

Definition statement

This place covers:

Any type of magnetic separation device that uses a high gradient magnetic field

References

Limiting references

This place does not cover:

Any type of magnetic separation method that uses a high gradient magnetic field	B03C 1/002

B03C 1/029

with circulating matrix or matrix elements (matrix elements B03C 1/034)

References

Limiting references

This place does not cover:

The matrix elements themselves	B03C 1/034

B03C 1/0337

{superconductive}

Definition statement

This place covers:

Any detail about the construction of the superconductive coil.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Superconductive coils for open gradient separators	B03C 1/0355

B03C 1/034

characterised by the matrix elements

Definition statement

This place covers:

Any detail about the construction of the magnetic matrix of the matrix cleaning system.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

High gradient separators having (circulating) matrix elements	B03C 1/029

B03C 1/0355

using superconductive coils

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details about the construction of the superconductive coil	B03C 1/0337

B03C 1/10

with cylindrical material carriers (B03C 1/247 takes precedence)

Definition statement

This place covers:

Any device whereby the material to be separated and/or the separated material is moved with cylindrical means.

References

Limiting references

This place does not cover:

Any devices with cylindrical magnetic means e.g. rotating drum	B03C 1/247

B03C 1/247

obtained by a rotating magnetic drum

References

Limiting references

This place does not cover:

Any device whereby the material to be separated and/or the separated material is moved with cylindrical means.	B03C 1/10

B03C 1/26

with free falling material (B03C 1/035 takes precedence)

References

Limiting references

This place does not cover:

Open gradient magnetic separators, i.e. separators in which the gap is unobstructed, characterised by the configuration of the gap	B03C 1/035

B03C 1/28

Magnetic plugs and dipsticks

Definition statement

This place covers:

Any type of device/method for separating particles contained in a liquid.

Special rules of classification

The following Indexing Codes are used:

Indexing Code B03C 2201/18	the particles are suspended in a liquid

Indexing Code B03C 2201/26	for use in medical applications

B03C 1/30

Combinations with other devices, not otherwise provided for

Definition statement

This place covers:

Typically used when the magnetic separation is part of a bigger process. However, documents should not be classified here when no (sufficient) details of the magnetic separation are disclosed

B03C 1/32

acting on the medium containing the substance being separated, e.g. magnetogravimetric-, magnetohydrostatic-, or magnetohydrodynamic separation {(sink-float separation using heavy liquids or suspensions B03B 5/30)}

References

Limiting references

This place does not cover:

Sink-float separation using heavy liquids or suspensions	B03B 5/30

B03C 3/00

Separating dispersed particles from gases or vapour, e.g. air, by electrostatic effect {(use of electrostatic separators in combination with exhausts of machines or internal combustion machines F01N 3/01)}

Definition statement

This place covers:

Any device and method using an electrostatic effect for separating. e.g., devices that use electrostatic effect for filtering air

References

Limiting references

This place does not cover:

Use of electrostatic separators in combination with exhausts of machines or internal combustion machines	F01N 3/01

Informative references

Attention is drawn to the following places, which may be of interest for search:

Domestic cleaning implements functioning electro statically	A47L 13/40

Separation of gases or vapours; Recovering vapours of volatile solvents from gases; Chemical or biological purification of waste gases (e.g. engine exhaust gases, smoke, fumes, flue gases, aerosols) by electrostatic effects or by high-voltage electric fields	B01D 53/323
Cleaning by electrostatic means	B08B 6/00
Electric elements specially adapted for carrying off electrostatic charges from vehicles	B60R 16/06
Treatment of water, waste water, or sewage by electrochemical methods	C02F 1/46
Electrostatic machines	H02N
Carrying-off electrostatic charges in general	H05F

Special rules of classification

When the electrostatic effect is not used for separating, it should not be classified here.

The following Indexing Codes are used:

Indexing Code B03C 2201/14	The gas is moved electro-kinetically
Indexing Code B03C 2201/24	measuring or calculating parameters, efficiency, etc.
Indexing Code B03C 2201/26	for use in medical applications
Indexing Code B03C 2201/30	for use in or with vehicles
Indexing Code B03C 2201/32	checking the quality of the result or the well-functioning of the device
Indexing Code B03C 2201/12	Cleaning the device by burning the trapped particles.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

"Separating" means dimensional modifications of particle-liquid distributions, e.g. particle immobilisation, caging, translational or rotational motion.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

ESP	electrostatic precipitator
DEP	di-electrophoresis
nDEP or pDEP	negative di-electrophoresis or positive di-electrophoresis

B03C 3/011

Prefiltering; Flow controlling

Definition statement

This place covers:

Mechanical filtering or flow control before the actual ESP filter.

References

Limiting references

This place does not cover:

Combinations of electrostatic separators, e.g. in parallel or in series, stacked separators, dry-wet separator combinations	B03C 3/025
Mechanical filtering combined with the ESP filter	B03C 3/155
Flow control in the ESP filter	B03C 3/36

B03C 3/014

Addition of water; Heat exchange, e.g. by condensation

Definition statement

This place covers:

Adding water for the purpose of changing the characteristics of the gas mixture to be treated.

References

Limiting references

This place does not cover:

Wet type ESP	B03C 3/16
Cleaning the electrodes by washing	B03C 3/74

Informative references

Attention is drawn to the following places, which may be of interest for search:

Liquid electrodes	B03C 3/53

B03C 3/017

Combinations of electrostatic separation with other processes, not otherwise provided for

Definition statement

This place covers:

Typically used when the electrostatic separation is part of a bigger process. However, documents should not be classified here when no (sufficient) details of the electrostatic separation are disclosed

B03C 3/019

Post-treatment of gases

Definition statement

This place covers:

Mechanical filtering or flow control after the actual ESP filter.

References

Limiting references

This place does not cover:

Mechanical filtering combined with the ESP filter	B03C 3/155

Informative references

Attention is drawn to the following places, which may be of interest for search:

Combinations of electrostatic separators, e.g. in parallel or in series, stacked separators, dry-wet separator combinations	B03C 3/025

B03C 3/02

Plant or installations having external electricity supply (electrode constructions B03C 3/40)

References

Limiting references

This place does not cover:

Electrode constructions	B03C 3/40

B03C 3/06

characterised by presence of stationary tube electrodes

Definition statement

This place covers:

Any type of device where a bundle of tube electrodes is used.

References

Limiting references

This place does not cover:

Details of the electrodes themselves	B03C 3/40
Constructional details of tubular collecting electrodes	B03C 3/49

B03C 3/09

characterised by presence of stationary flat electrodes arranged with their flat surfaces at right angles to the gas stream

Definition statement

This place covers:

Any device where the gas stream is forced to change direction to flow between the flat electrodes or where the gas stream is passing through the electrodes e.g. grid-electrodes

B03C 3/14

characterised by the additional use of mechanical effects, e.g. gravity (B03C 3/32 takes precedence)

References

Limiting references

This place does not cover:

Transportable units, e.g. for cleaning room air	B03C 3/32

Informative references

Attention is drawn to the following places, which may be of interest for search:

Separating particles from gases by gravity	B01D 45/02

B03C 3/15

Centrifugal forces

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Separating particles from gases by centrifuges	B01D 45/12
Centrifuges in general	B04B
Selective separation of solid materials carried by, or dispersed in, gas currents using centrifugal force	B07B 7/08

B03C 3/155

Filtration

Definition statement

This place covers:

Mechanical filtering combined with the actual ESP filter.

References

Limiting references

This place does not cover:

Mechanical filtering before the actual ESP filter	B03C 3/011
Mechanical filtering after the actual ESP filter	B03C 3/019

Informative references

Attention is drawn to the following places, which may be of interest for search:

Combinations of electrostatic separators, e.g. in parallel or in series, stacked separators, dry-wet separator combinations	B03C 3/025

B03C 3/16

wet type

Definition statement

This place covers:

Any device where the added liquid (e.g. water) is not completely absorbed by the treated gas

References

Limiting references

This place does not cover:

Adding water for the purpose of changing the characteristics of the gas mixture to be treated.	B03C 3/014
Cleaning the electrodes by washing	B03C 3/74

Informative references

Attention is drawn to the following places, which may be of interest for search:

Liquid electrodes	B03C 3/53

B03C 3/32

Transportable units, e.g. for cleaning room air (room air-conditioners having an electrostatic separating stage F24F)

References

Limiting references

This place does not cover:

Room air-conditioners having an electrostatic separating stage	F24F

B03C 3/36

Controlling flow of gases or vapour

Definition statement

This place covers:

Flow control in the actual ESP filter.

References

Limiting references

This place does not cover:

Flow control in before the ESP filter	B03C 3/011
Flow control in after the ESP filter	B03C 3/019
Combinations of electrostatic separators, e.g. in parallel or in series, stacked separators, dry-wet separator combinations	B03C 3/025
Mechanical filtering combined with the ESP filter	B03C 3/155

B03C 3/363

{located before the filter}

Definition statement

This place covers:

The flow control is located at the entrance of the ESP

B03C 3/365

{located after the filter}

Definition statement

This place covers:

The flow control is located at the exit of the ESP

B03C 3/38

Particle charging or ionising stations, e.g. using electric discharge, radioactive radiation, flames (electrode constructions B03C 3/40; ionising gases H05H)

Definition statement

This place covers:

Any device where particles are electro statically charged for the purpose of separating them.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electrode constructions	B03C 3/40
Disinfection, sterilisation or deodorisation of air by ionisation	A61L 9/22
Air-conditioning systems applying an electrostatic field	F24F 3/166
Apparatus for generating ions to be introduced into non-enclosed gases	H01T 23/00
Ionising gases	H05H

B03C 3/40

Electrode constructions

References

Limiting references

This place does not cover:

Electrode-carrying means	B03C 3/86

B03C 3/41

Ionising-electrodes

Special rules of classification

Indexing Codes B03C 2201/02 - B03C 2201/10 have to be given in order to describe the type of electrode

The following Indexing Codes are used:

Ionising electrode being a wire	Indexing Code B03C 2201/04
Ionising electrode being a needle	Indexing Code B03C 2201/06
Ionising electrode being a rod	Indexing Code B03C 2201/08
Ionising electrode has multiple serrated ends or parts.	Indexing Code B03C 2201/10

B03C 3/455

{specially adapted for heat exchange with the gas stream (B03C 3/53 takes precedence)}

References

Limiting references

This place does not cover:

Liquid, or liquid-film, electrodes	B03C 3/53

B03C 3/47

flat, e.g. plates, discs, gratings

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

ESP having stationary flat electrodes arranged with their flat surfaces parallel to the gas stream	B03C 3/08
ESP having stationary flat electrodes arranged with their flat surfaces at right angles to the gas stream	B03C 3/09

B03C 3/49

tubular {(B03C 3/455 takes precedence)}

Definition statement

This place covers:

The details of the electrodes themselves

References

Limiting references

This place does not cover:

Collecting electrodes specially adapted for heat exchange with the gas stream	B03C 3/455

Informative references

Attention is drawn to the following places, which may be of interest for search:

Any type of device where a bundle of tube electrodes is used	B03C 3/06

B03C 3/53

Liquid, or liquid-film, electrodes

References

Limiting references

This place does not cover:

Cleaning the electrodes by washing	B03C 3/74

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wet type ESP	B03C 3/16

B03C 3/68

Control systems therefor

Definition statement

This place covers:

Details about the electrical power supply of the ESP, except the emergency control aspects.

References

Limiting references

This place does not cover:

Emergency control systems	B03C 3/72

Electricity supply or control systems for cleaning the electrodes	B03C 3/746, B03C 3/765

Informative references

Attention is drawn to the following places, which may be of interest for search:

Power supply for an electrostatic spraying apparatus	B05B 5/0531, B05B 5/10

B03C 3/70

insulating in electric separators (B03C 3/53 takes precedence)

References

Limiting references

This place does not cover:

Liquid, or liquid-film, electrodes	B03C 3/53
Use of special materials other than liquids for collecting electrodes	B03C 3/60
Protective coatings of housings	B03C 3/84
Electrode-carrying means	B03C 3/86

B03C 3/72

Emergency control systems

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Emergency protective circuit arrangements in general	H02H

B03C 3/74

Cleaning the electrodes

Special rules of classification

This subclass does not only cover the cleaning of the electrodes but also all details about cleaning the interior of the ESP.

The following Indexing Codes are used:

Indexing Code B03C 2201/12	Cleaning the device by burning the trapped particles.
Indexing Code B03C 2201/28	Parts being easily removable for cleaning purposes
Indexing Code B03C 2201/24	measuring or calculating parameters, efficiency, etc.
Indexing Code B03C 2201/32	checking the quality of the result or the well-functioning of the device

B03C 3/746

{Electricity supply or control systems therefor}

References

Limiting references

This place does not cover:

Electricity supply or control systems of the ESP	B03C 3/68

B03C 3/763

{Electricity supply or control systems therefor}

References

Limiting references

This place does not cover:

Electricity supply or control systems of the ESP	B03C 3/68

B03C 3/78

by washing

Definition statement

This place covers:

Any device using a liquid where the purpose of the liquid is to clean.

References

Limiting references

This place does not cover:

Wet type ESP	B03C 3/16

Informative references

Attention is drawn to the following places, which may be of interest for search:

Liquid, or liquid-film, electrodes	B03C 3/53

B03C 3/82

Housings

References

Limiting references

This place does not cover:

Electrode-carrying means	B03C 3/86

B03C 3/84

Protective coatings

Definition statement

This place covers:

Any coating or special layer of the housing not of the electrodes

References

Limiting references

This place does not cover:

Electrode constructions	B03C 3/40

B03C 3/86

Electrode-carrying means (B03C 3/40 takes precedence)

Definition statement

This place covers:

Any detail about the (mechanical) fixation of the electrodes (including the electrical isolators).

References

Limiting references

This place does not cover:

Electrode constructions	B03C 3/40
Use of special materials other than liquids for collecting electrodes	B03C 3/60
Protective coatings of housings	B03C 3/84

B03C 3/88

Cleaning-out collected particles

Definition statement

This place covers:

Any detail about the removal of particles that have already been removed from the electrodes and/or walls.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cleaning of the electrodes	B03C 3/74

B03C 5/00

Separating dispersed particles from liquids by electrostatic effect ({flocculation or agglomeration of electric particles induced by electric field B01D 21/0009; microreactors B01J 19/0093}; combined with centrifuges B04B 5/10; {treatment of microorganisms and apparatus therefor C12M 1/42, C12N 13/00, C12Q 1/24; analysis of biomaterial by electrical means G01N 33/48707})

References

Limiting references

This place does not cover:

Flocculation or agglomeration of electric particles induced by electric field	B01D 21/0009
Separation, other than separation of solids, not fully covered by a single other group or subclass, (e.g. B03C) by electrophoresis	B01D 57/02
Combined with centrifuges	B04B 5/10

Informative references

Attention is drawn to the following places, which may be of interest for search:

Microreactors	B01J 19/0093
Treatment of microorganisms and apparatus therefor	C12M 1/42, C12N 13/00, C12Q 1/24
Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means using electrophoresis	G01N 27/447

Special rules of classification

The following Indexing Codes are used:

Indexing Code B03C 2201/24	measuring or calculating parameters, efficiency, etc.
Indexing Code B03C 2201/26	for use in medical applications
Indexing Code B03C 2201/32	checking the quality of the result or the well-functioning of the device

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

ESP	electrostatic precipitator
DEP	di-electrophoresis
nDEP or pDEP	negative di-electrophoresis or positive di-electrophoresis

B03C 5/005

{Dielectrophoresis, i.e. dielectric particles migrating towards the region of highest field strength (B03C 5/02 takes precedence; electrophoresis B01D 57/02)}

Definition statement

This place covers:

Any method using di-electrophoresis for separating particles from a fluid. Separating fluids from fluids is in B03C 11/00

References

Limiting references

This place does not cover:

Any device using di-electrophoresis for separating particles from a fluid.	B03C 5/022

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electrophoresis	B01D 57/02

B03C 5/02

Separators

References

Limiting references

This place does not cover:

Any method not using di-electrophoresis for separating particles from a fluid	B03C 5/00
Any method using di-electrophoresis for separating particles from a fluid	B03C 5/005

B03C 9/00

Electrostatic separation not provided for in a single preceding main group

Definition statement

This place covers:

Other types of electrostatic separation except for electro-statically separating liquids from liquids

References

Limiting references

This place does not cover:

Magnetic separation	B03C 1/00
Separating dispersed particles from gases or vapour	B03C 3/00

Separating dispersed particles from liquids by electrostatic effect	B03C 5/00
Separating solids from solids by electrostatic effect	B03C 7/00
Electro-statically separating liquids from liquids	B03C 11/00

B03C 11/00

Separation by high-voltage electrical fields, not provided for in other groups of this subclass

Definition statement

This place covers:

This group is used for electro-statically separating liquids from liquids

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Separation of liquids with coalescers	B01D 17/045
Separation of liquids from each other by electricity	B01D 17/06
Filters i.e. particle separators or filtering processes specially modified for separating dispersed particles from gases or vapours including coalescing means for the separation of liquid	B01D 46/003
Refining of hydrocarbons oils by electric or magnetic mean	C10G 32/02

Special rules of classification

The following Indexing Codes are used:

Indexing Code B03C 2201/02	Electro-statically separating liquids from liquids